National Institute of Environmental Health Sciences

The effects of weather and air pollution on cardiovascular and respiratory mortality in Santiago, Chile, during the winters of 1988-1996

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Abstract:

This study quantifies the effects of stressful weather and elevated air pollution levels on cause-specific mortality in Santiago, Chile, during the austral winters from 1988 to 1996. A temporal synoptic index (TSI) is used to form weather classes and air pollution classes. Prior applications of the TSI have formed classes solely on the basis of weather and may have systematically underestimated the impact of air pollution levels on daily mortality. In Santiago, the attribution of increased mortality risk was found to be largely dependent on the type of class formed (weather or pollution). High-mortality weather classes were associated with cold, dry and high-pressure conditions, while high-mortality pollution classes were associated with elevated NO(2) and PM(10-2.5) concentrations. Cardiovascular disease mortality was more sensitive to weather conditions, and respiratory mortality was more sensitive to pollution levels. Respiratory mortality was most sensitive to stressful conditions at longer lag times (3-6 days), while cardiovascular mortality was most sensitive at shorter lag times (0-2 days). By understanding the relative magnitudes of health risks associated with stressful weather and air pollution conditions we can improve existing air pollution/weather watch systems and better anticipate future, risks associated with global climate change. Copyright (C) 2007 Royal Meteorological Society.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Temperature, Other Exposure

Air Pollution: Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): CO, NO2; SO2

Temperature: Fluctuations

Other Exposure: cloud coverage; dew point

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Central/South America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular disease mortality

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory disease mortality

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified